

Application/Control Number: 09/677,493  
Filing Date: 10/02/2000  
Art Unit: 2172  
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January 31, 2003

Baoquoc N. To  
Commissioner of Patents and Trademarks  
Washington, D.C. 20231



**Marked Up Version of Amendment**

Dear Mr. To,

I filed a patent application in your offices, INTEGRATED DATABASE DATA EDITING SYSTEM, Application #09/677,493, Filing Date: 10/02/2000. I sent the Clean Version of Amendment to you on August 12, 2002. Attached is the Marked Up Version of Amendment. If you need more information, please let me know. Thanks.

Sincerely,

*George G. Yang*  
George Guang Yang

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January 31, 2003

**Statement of No New Matter**

I, GEORGE GUANG YANG, declare that I do not add new matter to the amendment of my patent application, INTEGRATED DATABASE DATA EDITING SYSTEM.

Declarer,



George Guang Yang

Application/Control Number: 09/677,493  
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Art Unit: 2172  
(Marked Up Version of Amendment)

In re Patent Application of

GEORGE GUANG YANG  
(GUANG YANG)

For

“Integrated Database Data Editing System”

filed with the USPTO

Application/Control Number: 09/677,493

Filing Date: 10/02/2000

Art Unit: 2172

(Marked UP Version of Amendment)

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## INTEGRATED DATABASE DATA EDITING SYSTEM

### 10 FIELD OF THE INVENTION

This invention relates to the field of computer database data integrated editing system, more specifically to a novel system and methods, which remotely edits and manages the relational databases through either intranet or Internet.

(This invention relates to the field of computer database data integrated editing system, more specifically to a novel system and methods, which directly retrieve database text and binary data, modify the data and then send the data back to the original database through either intranet or Internet.)

### BACKGROUND OF THE INVENTION

20 The present invention is directed to a novel integrated database data editing system, which uses the visual environment and the GUIs (Graphical User Interfaces) and tools to remotely access and directly edit and manage the relational database data contents in an efficient and easy-to-use manner through the computer networks. Computer networks are the networking systems that link a plurality of computers with  
25 electric wires and work together through the standard network protocols. All the computers linked on the networks work together in a client/server manner. The computer servers provide application services to a plurality of computer clients, and the client computers access and utilize these services through the networks. Each computer linked on the networks has a unique network interface with a unique IP (Internet Protocol)  
30 address. Typically, a home computer is connected to the Internet or other networks through a computer modem. The corporation computers are usually connected to the corporation private networks or Internet through the computer network adapters. The

intranet is the private network of a corporation or government agency including the LAN (Local Area Network) and WAN (Wide Area Network). The Internet is the "Inter-networks" that links all the sub-networks (intranets) together through a plurality of Internet routers and standard Internet protocols. Typically, the intranets are linked to the Internet through a firewall or a computer proxy server, which only allows a group of pre-selected Internet protocol data flows to pass through.

(Computer database is the central data repository place for most software applications. The database stores data temporarily or permanently, and in most cases the database data needs to be dynamically input, output, modified or updated frequently. In most business applications, especially the e-commerce applications such as product catalogues or product advertisement, the data stored in database is not only the text or character data, but also more likely the binary (or digital) data, such as image, audio, animation, video or compiled software program, etc. One of the best practices for network software applications is to separate the data contents and the data presentation, which means that the data contents need to be stored in database and then passed to the Windows Graphic User Interface (GUI) or web page for presentation. So, an efficient and easy-to-use database data editing system is urgently needed to input, output and edit the database data contents for these business software applications.)

An intranet uses the network management software such as Microsoft Windows NT or Novell Network to directly link the computers together, where each computer linked on the intranet has an IP address or a name unique for the network. The client computers communicate with the server computers through the standard network protocols. The TCP/IP (Transfer Control Protocol/Internet Protocol) is the basic and most popular network protocol for the intranet and also for all the other computer networks. The TCP/IP is a "connection-oriented" network protocol. When a client computer requests a service from a server computer or the server computer replies to the client computer, the TCP first establishes a connection between the client and the server, and then the IP transfers the datagrams between the client and the server. When the data transmission is finished, the TCP terminates the connection. The TCP/IP connects and transfers datagrams between the client computer and the server computer based on the IP

addresses of the client and server computers that are unique for the network. The computer IP addresses are managed by the computer network management software.

The Internet links all the private networks together through the computer network routers and firewalls, and provide us such an efficient way to communicate with our  
5 neighbors, our corporation branch offices or the people living on another continent anytime and anywhere. An Internet router maintains a dynamic routing table that contains the globally registered IP addresses of all the computer nodes linked on the Internet, and forwards the IP datagrams based on the source host and destination host computer IP addresses carried on these datagrams. The client computers and server  
10 computers linked on Internet communicate with each other through the standard TCP/IP based Internet protocols such as HTTP (HyperText Transfer Protocol), FTP (File Transfer Protocol), SMTP (Simple Mail Transfer Protocol), EDI (Electric Data Interchanger) or other RPC (Remote Procedure Call) based Internet protocols. Each computer node linked on the Internet, including the client computer, server computer and  
15 router, has at least one globally registered IP address or URL (Universal Resource Locator). The computers find and communicate with each other based on these unique IP addresses or URLs. The HTTP is an Internet application protocol built on the above of TCP/IP for the communication between a client computer browser and an HTTP server (or web server) installed in a server computer in a request/response two-way  
20 communication manner. The client browser sends out the requests through Internet to the server computer HTTP server, and the HTTP server replies to the client browser through the CGI (Common Gateway Interface). The CGI is the standard interface of an HTTP server for the request/response communication between the browser and the HTTP server. The WWW (World Wide Web) web pages are the most popular computer  
25 software applications used for communications between a client computer browser and a web server of a computer server through Internet and also intranet. A numerous web sites have been built based on the web pages and the HTTP. The FTP comprises a FTP server that is hosted in a server computer and a FTP client that is hosted in a client computer. The FTP server is used to store data files where the FTP clients can upload or  
30 download the data files through the intranet or Internet. The SMTP is a message-based Internet protocol that is used to transfer e-mails between the computer e-mail servers.

The EDI is also a message-based protocol to transfer data files between the EDI client computer and the server computer. The RPC is used to implement the communication applications in a caller/listener manner between any client computers and server computers coupled on the intranet or Internet.

5        Computer relational database is the central data repository place for most software applications, and is widely used in most client/server enterprise software applications and web applications. Typically, a relational database application is installed in a computer server and is accessed and used by a plurality of computer clients coupled on the networks. The client/server enterprise database application is typically in the "two-tier" software architecture and is used inside the private corporation intranet, where the client computer communicates with the server computer that contains the database through a  
10 numerous client/server socket links. The web database application is typically in the "three-tier" software architecture and is used for Internet application, where the client browser communicates with the web server through IITIP and the web server  
15 communicates with the database. The client/server software applications can only run inside the intranet but not the Internet because the intranet is protected by the firewall and the socket links between the client computer and the server computer cannot pass through the firewall. Further more, the IP addresses of the client and server computers need to be globally registered for the Internet database applications.

20        In a database software application, a database is called the "back-end" that works independently and uses the standard SQL (Structured Query Language) to communicate with the software logic "middle-ware" and the presentation "front-end" through the DBMS (DataBase Management System). A relational database stores data temperately or permanently and in most cases the database data needs to be dynamically input, output,  
25 modified or updated frequently and timely. The data stored in all the relational databases are simple text data or binary data types that are universal for all the computer platforms and the relational databases. In most business applications, especially the Internet e-commerce applications such as product catalogue or product advertisement, the data stored in the database is not only the small text or character data, but also more likely the  
30 large text or binary data types, such as large text file, voice, audio, image, picture, animation, video or compiled software program. One of the best practices for database

software applications is to separate the data content and the data presentation, where the data content is stored in the relational database and then treated by the "middle-ware" and passed to the Windows Graphic User Interface (GUI) or web page for display.

5 All the commercial relational databases support the small text data type. Some  
major commercial relational databases, such as Oracle database and IBM DB2, also  
support the Large Object (LOB) data types including the Character Large Object (CLOB)  
and the Binary Large Object (BLOB). The CLOB data type supports text (ASCII, 8-bit)  
or character (16-bit) data, and the BLOB data type supports multimedia data such as  
audio, image, animation, video, compiled software program, etc. Further more, the  
10 Oracle database also supports LONG, LONG RAW, NCLOB and BFILE data types. The  
LONG stands for text or character data. The LONG RAW stands for long binary data.  
The NCLOB is for multi-byte character set. The BFILE stands for Binary File that is  
stored outside the database but coupled with a file path stored inside the database. The  
DB2 supports DBCLOB data type, which stands for Double-Byte Character Large  
15 Object. All of the LOB data types can store the data size up to 2 Gigabytes or 4  
Gigabytes, and the data is stored either inside the database or outside the database as  
"out-of-line" data. The DataBase Management System (DBMS) of a relational database  
uses a Locator that is stored inside the database to refer or point to the actual data when  
the data is stored either as a separate data set or outside the database. The LOB data  
20 values are manipulated and processed by the DBMS using the built-in specific functions  
and procedures, which is very difficult to use and to handle these large data types even  
for the computer software professionals.

(Most commercial relational databases, such as Oracle database and IBM DB2,  
support the Large Object (LOB) data types, which mainly include the Character Large  
25 Object (CLOB) and the Binary Large Object (BLOB). The CLOB data type supports text  
(ASCII, 8-bit) or character (16-bit) data, and the BLOB data type supports multimedia  
data such as image, audio, animation, video, compiled software program, etc. Further  
more, the Oracle database also supports LONG, LONG RAW, NCLOB and BFILE data  
types. The LONG stands for text or character data. The LONG RAW stands for long  
30 binary data. The NCLOB is for multibyte character set. The BFILE stands for Binary  
File which cannot be directly stored inside the database. The DB2 supports DBCLOB



data type, which stands for Double Byte Character Large Object. All of the LOB data types can store the data size up to 2 Gigabytes or 4 Gigabytes, and the data is stored either inside the database or outside the database as "out-of-line" data. The DataBase Management System (DBMS) of a relational database uses a Locator that is stored inside  
5 the database to refer or point to the actual data when the data is stored either as a separate data set or outside the database. The LOB data values are manipulated and processed by the DBMS using the built-in specific functions and procedures, which is very difficult to handle even for the computer software professionals.)

Most relational database vendors sell their databases independently. Some of  
10 them sell the databases with a simple tool or employ the third party products to manage their databases. These client side tools provide the GUIs to write the individual SQL or SQL\*Plus codes to access and manage the databases inside the intranet. None of them can work on the Internet because the client and server computers need to use the HTTP to communicate each other for Internet applications. There are also some commercial  
15 database reports software products available on the market, which can access and read the database data through intranet or Internet, but all of these database reports products are the "read only" software. None of them can update, modify or input, output the data for the database. As will be described, the present invention provides an integrated database data editing system that is used to remotely access the relational database to manage the  
20 database and to modify, update, input or output the database data contents including the large data types through either the intranet or the Internet.

(The present invention is directed to a novel integrated database data editing system, which uses the visual GUI and tools to directly modify and edit the database data in an efficient and easy-to-use manner. The data editing system can edit both the text  
25 data and the binary data such as image, audio or video data by incorporating several commercial text and multimedia data editors installed on the local client computer. The editing system is implemented as a client/server version and a web version to remotely edit the database contents through either intranet or Internet. While the prior art may offer some useful methods and mechanisms for editing individual, separate data types  
30 and data files, none of them provide the integrated system and advantages to be gained by this invention. Such prior art is reflected in the following U.S. Patents:)

(a.) No. 5,864,682, to Porter et al., discloses a method and apparatus for use in a digital video delivery system, where a digital representation of an audio-visual work, such as MPEG file, is parsed to produce a tag file. The tag file includes information about each of the frames in the audio-visual work. During the performance of the audio-visual work, data from the digital representation is sent from a video pump to a decoder. Seek operations are performed by causing the video pump to stop transmitting data from the current position in the digital representation, and to start transmitting data from a new position in the digital representation. The information in the tag file inspected to determine the new position from which to start transmitting data. To ensure that the data stream transmitted by video pump maintains compliance with the applicable video format, prefix data that includes appropriate header information is transmitted by said video pump prior to transmitting data from the new position. A video editor is provided for generating a new video file from pre-existing video file based on editing commands and the information contained in the tag files of the pre-existing video files. A presentation rate, start position, end position, and source file may be separately specified for each sequence to be created by the video editor.)

(b.) No. 5,875,448, to Boys et al., is directed to an Audio Editor that operates with files capable of storing text and voice data in separate regions, provides functions for entering data as voice data, and also for fully editing the entered voice data. Files can be uploaded from the Audio Editor to a PC application for converting the file entirely to text, providing a system wherein all variable entry and editing can be done verbally, and conversion to text left as a final chore. In an alternative embodiment the Audio Editor is implemented as a PC application wherein a user can enter and fully edit variable input as voice, and then communicate the resulting file to another for final conversion. In yet another embodiment the Audio Editor is implemented as additional functionality to a high-end word processor application. In further embodiments computerized natural data editors are provided for reviewing and editing natural data streams of all sorts, such as video streams, musical works, and the like.)

(c.) No. 5,950,207, to Mortimore et al., relates to a computer database for medical imaging that stores and manipulates multimedia data from various sources and reduces misidentification of data. A unique identifier is generated and linked to each data

subject, preferably at the time the image is generated. A graphical representation of the identifier is incorporated into the image or text when displayed or printed. A decoder may be used to read the representation, allowing the identifier to be read and identify the data.

(4.) No. 6/33,309, to Dancy et al., provides a system for the direct editing of wide files for convenient viewing of selected columns. The system uses a function key to invoke a window that lists multiple possible combinations of views of the file which can be selected to present a choice of fields to be viewed simultaneously on the same screen. The fields represent a collection of columns which are a subset of the columns of the entire file. The system presents selected columns of data in a narrow window to facilitate viewing, comprehending, and/or editing the data.)

(b) No. 63,952,323, to Pinner et al., is related to a multi-media collaboration system enabling multiple multimedia contributors and making processing mechanisms with off-the-client components which support information sharing and distribution. More specifically, the system provides an open-based multimedia collaboration environment that enables the creation of messages containing synchronized video, graphics and sound, and provides a detailed environment associated with an underlying multimedia object. On the server side, the system includes a dedicated conference manager component to coordinate the database, an email server, a newsgroup server and a web server. On the client side, the system includes a dynamic multimedia client which embodies the use of synchronized video, graphics and sound generated in the browser. The client side also includes a newsgroup and reader and a file download.

(The foregoing prior art presents several methods or systems for editing audio or video data, or retrieving or viewing database data. However, none of them give the mechanisms, versatility and advantages in the manner of the present invention.)

### SUMMARY OF THE INVENTION

This subsection is directed to an *extended database data entry system* that provides a virtual environment, graphics user interface and tools to remotely access the relational database and to manage and edit the database data contents. This database data entry system is used to input, correct, modify and update the database data contents in an efficient and easy-to-use manner, and it is especially useful for entering large database objects such as large text files and media (image, animation and video) objects. An illustration of the extended database data entry system is shown in Figure 10.

(This feature is directed at an integrated database client-server system such as *Microsoft Access*, *Microsoft Visual Basic*, or *Visual FoxPro*. The server-side tables are stored in a separate database component in an efficient queryable format. This allows systems to efficiently deliver mail by editing large database objects such as images, audio, video, animation and video binary data files. The queries require a complete server, containing a relational database which supports large object types and a computer's CPU. The server and client are linked on other internet or Intranet. The client needs query to the database through the network to retrieve a set of data, and materializes the data on its display on the client screen either on the Windows Graphic User Interface (GUI) forms or web pages. The data table displayed on the client screen is identified as follows). When the mouse "double-clicks" on a table entry, the data of the cell can be directly edited by the actions of inserting, overwriting, deleting, copying, paste, etc. When the mouse "double-clicks" the table cell, a default menu item inserted on the client computer is popped up depending on the type of the cell. If the data is not a character data type, a Notepad or Wordpad opens up. If the data is binary image, an Image or Paint Shop draws it up. If the data is binary audio file or a multimedia either on Audio CD or Animation DVD, ActiveX control or VideoPlayer pops up. A list of the data relates immediately on the data table, and the user could click on the data items provided by the server. When the user finished the data editing, the data file is directly saved and transformed in the remote database through the network.)

The database data-cubing system comprises a computer client and a computer server containing a relational database that supports the target data objects. The client and server components are linked via either Intranet or Internet. The client component sends

[illegible][illegible]

There are two benchmark versions for the integrated database data editing system: a client-server version and a web version. The client-server version is developed and runs on the internet. The client connects Database Data Manager Windows GUIs on

backlogged by using Java Virtual C++ Virtual Device or other related connectivity mechanisms. The server and data is transferred to SQL (Structured Query Language) through JDO/JDBC (Java Database Connectivity/JDBC) Connectional bridge between the client computer and the server database.

[illegible]

(There is also an implementation version for the data entry system, a client/server version and a web version. The client/server version is installed and run on the Internet. The Windows GUI are implemented by using Java, SNI, Visual Basic, or, alternately Visual C++ or Visual Basic, etc. The query and data is transmitted by SQL, RDBC/ODBC to the client and the server or database. The Database Data Manager seems to similar to a Windows Explorer and contains a Visual Panel and a Detail Panel. The Header Panel lists the database tables. The Detail Panel consists of several sub-labels, which includes the Label, Relationship Diagrams, Table, Data, Relationships, Views, Data Filter and SQL Command. When the mouse clicks a table name, listed on the Header Panel, the table contents are retrieved from the source database and displayed on the screen as a Single Textual Interface (STI) table. The user can view and click multiple table

names, then the Multiple Document Interface (MDI) tables are displayed. The data on a table cell is default as read-only. The user single-clicks a cell to directly edit the data of the cell, and double-clicks a cell to pop up a data editor. The user can edit the data by using the facilities provided by the data editor, and directly send the data back to the original database.)

The user authentication and access control mechanisms are well implemented to identify the users. The web version of the integrated database data editing system has more advantages compared to the client/server version. The firewall is used to protect the computer server that contains the database and the web server. The Public Key Infrastructure (PKI) and Secure Socket Layer (SSL) are used to implement the security features of the web version. Further more, the web version can be deployed and run on any other network systems beside the Internet.

(The web version of the data editing system consists of a server containing a database and a web server and a client with a browser. The editing system is mainly implemented by using Java technologies. The JDBC/ODBC is used to retrieve and transfer data from the database, the Servlets and Java ServerPages are used to implement the middle ware, and the HTML, DHTML, JavaScript and Applets are used to implement the web pages. The Database Data Manager page, similar to the Windows GUI Database Data Manager of the client/server version, is comprised of a Header Frame and a Detail Frame. When the user clicks a table name on the Header Frame table list, a new web page containing the table data is displayed. The data on the table cell is default as read-only. When the user single-clicks a cell, the data can be directly edited, and the user double-clicks the cell, a data editor installed on the local client computer pops up. When the user finishes the data edition, the data is directly sent back to the original database through the Internet.)

(The other computer languages, such C++, C, Visual C++, Visual Basic, etc., can also be used to implement both the client/server version and the web version of the editing system. The Secure Socket Layer (SSL), Secure Electric Transaction (SET) and Public Key Infrastructure (PKI) technologies are used for secure data transmission through the Internet. The user authentication and access control mechanisms are also used to identify the users.)

## BRIEF DESCRIPTION OF DRAWING

Figure 1 is a general schematic representation of the integrated database data editing system.

5 (Figure 1 is a general schematic representation of the integrated database data editing system.)

Figure 2 is a schematic representation of the client/server version of the integrated database data editing system.

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Figure 3 is a schematic representation of the detail mechanisms and Windows GUI forms of the client/server version of the integrated database data editing system.

(Figure 3 is a schematic representation of the detail mechanisms and Windows GUI forms of the client/server version of the integrated database data editing system.)

15 Figure 4 is a schematic representation of the web version of the integrated database data editing system.

(Figure 4 is a schematic representation of the web version of the integrated database data editing system.)

## 20 DETAILED DESCRIPTION OF THE INVENTION

This invention represents an integrated database data editing system that provides a visual environment, graphic user interfaces (GUIs) and tools in a client computer to remotely access a server computer containing a relational database to edit and manage the database contents in an efficient and easy-to-use manner through the networks. The database editing system is used to modify, update, input and output the relational database data and to manage the database, which is extremely useful for editing large database objects such as large text file, audio, voice, image, picture, animation and video binary data files by using the incorporated commercial text and multimedia editors installed on the client computer.

30 (This invention represents an integrated database data editing system that provides a visual environment and tools to input, output, modify and update the database data

contents in an efficient and easy-to-use manner. The data editing system is extremely useful for editing large database objects such as large text file, audio, image, animation and video binary data files by using the incorporated commercial data editors. The data editing system is mainly designed and implemented by using current Java technologies.

- 5 Figure 1 demonstrates that the database data editing system consists of a computer server 10 containing a relational database 11 which supports large text and binary data objects and a computer client 8 supporting the graphic user interfaces. The server and client are linked on either intranet or Internet 9. The client computer contains a Database Data Manager user interface, which provides the necessary environment and tools to edit the database data. The client sends query to the remote database through the network 9 to retrieve a set of the data. The database data is returned from the remote database to the client, and then materialized to display on the client screen either as the Windows Graphic User Interface (GUI) forms or web pages. The database table 2 displayed on the client screen is defaulted as read-only 3. When the mouse "single-clicks" on a table cell 15 4, the data of the cell is directly edited by the action of inserting, overwriting, deleting, copying, pasting, etc. When the mouse "double-clicks" a table cell 5, 6, a default data editor 1, 7 installed on the client computer is called and popped up depending on the data type of the cell. A list of the commercial data editors installed on the client computer is also provided to the user to choose. The data file is then automatically uploaded into the data editor. The user uses the data editor to edit the data file, and then send the data file back to the remote database through the network.)

- Figure 1 demonstrates that the database data editing system consists of a computer server 10 containing a relational database 11 that supports large text and binary data objects and a computer client 8 supporting the graphic user interfaces. The server 25 computer and client computer are linked on either intranet or Internet 9. In the case of intranet, the client computer contains a Microsoft Windows or other PC operation system that provides the graphic user interfaces. The server computer contains a relational database that supports the large text and binary data types. The client computer communicates with the server computer through the TCP/IP. In the case of Internet, the client computer contains an Internet browser Figure 4 (69) with the Microsoft Windows 30 or other PC operation system. The server computer contains a relational database that

supports the large text and binary data types and an HTTP server (or web server) Figure 4 (71) that communicates with the client computer browser through HTTP. In the present invention, the client computer contains a Database Data Manager user interface Figure 3 (41) that provides the necessary visual environment and tools to edit and manage the database data contents and is either installed permanently or downloaded by the browser on the client computer from the server computer. The client computer 8 sends a query to the remote server database 11 through the networks 9 to retrieve a set of the data. The database data is returned from the remote database to the client, and then materialized to display on the client screen either as the Windows Graphic User Interface (GUI) forms or web pages. The cells 3 of database table 2 displayed on the client computer screen are defaulted as read-only. The large text data type and binary data type are represented by the small icons 5, 6 as the place holders. When the mouse "single-clicks" a table cell 4, the small text data of the cell is directly modified by the action of inserting, overwriting, deleting, copying and pasting. When the mouse "double-clicks" an icon of the table cell 5, 6, a default data editor 1, 7 that is installed on the client computer is called and popped up depending on the data type of the cell. A list of the commercial data editors installed on the client computer is also provided to the user for selection. The data file of the cell is automatically retrieved from the remote database and uploaded into the data editor. The commercial data editor facilities are used to edit the data file. The edited data file is sent back to the remote original database 11 through the networks 9.

There are two implementation versions for the database data editing system of the present invention, a client/server version for intranet and a web version for Internet. Figure 2 demonstrates the client/server version of the editing system that is installed and run on the intranet 29. The server computer 31 contains a relational database 30 that supports the large text or binary data objects (LOBs). The client computer 28 sends query to the remote server database and the database data is retrieved from the database and then sent back to the client. The database data is then materialized and displayed on the client forms 22. The data cells 23 of the table form are defaulted as read-only. When the mouse single-clicks a cell of the table, the data of the cell 24 is directly edited. For the large text data and binary data types, the table cells display the small icons 25, 26 without actual data materialized to the client computer as default. When the user double-

clicks the cell icons 25, 26, a default commercial text editor 21 or a multimedia editor 27 is called and popped up from the local client computer. The data is then retrieved from the remote server database to the client computer and automatically uploaded into the popped-up data editor. A list of the available data editors on the local client computer can be popped up for the user to select. When the data editing is finished, the editor directly saves and sends the data back to the remote original database through the intranet.

(There are two implementation versions for the database data editing system of the present invention, a client/server version and a web version. Figure 2 demonstrates the client/server version of the editing system which is installed and run on the intranet. The server computer 31 contains a relational database 30 which supports the large text or binary data objects (LOBs). The client Window GUIs 28 are implemented by using Java AWT, Swing, Applets, or alternately by Visual C++, Visual Basic, etc. The client GUI forms and the server database communicate through the intranet 29. The client sends query to the remote database and the data is retrieved from the database by using SQL, JDBC/ODBC 29. The database data is then materialized and displayed on the client forms. The data cell 23 of the table form 22 is defaulted as read-only. When the mouse single-clicks on a cell of the table, the data of the cell 24 can be directly edited. When the user double-clicks the table cell 25, 26, a default commercial text editor 21 or a multimedia editor 27 is called and popped up from the local client computer. Alternately, a list of the available data editors on the local client computer can be popped up and let the user select. There are several commercial data editors installed on the client computer, such as the Notepad and Wordpad (Microsoft) are used for editing text (ASCII) or character data type, the AudioStation 32 (Voyette Turtle Beach, Inc.) is for editing audio data, the Imaging and Paint (Microsoft) are for editing images, the Animation Shop (Jacs Software, Inc.) and VideoStudio (Ulead Systems, Inc.) are for editing animation or video data files. Actually, there are many other commercial data editing software available and can be selected as the data editors for this system as well. The data is automatically uploaded to the popped up data editor from the table cell. The user then edits the data on the selected editor. When the data editing is done, the editor directly saves and sends the data back to the remote original database. The data



transmission between the client and the server is achieved by creating a JDBC/ODBC connection. The JDBC driver is created by bridging the JDBC to ODBC as a JDBC-ODBC bridge, or by directly connecting the JDBC to the database. The JDBC and the DataBase Management System (DBMS) contain enough built-in methods, functions and  
5 procedure to process these large text or binary data files.)

Typically, there are several commercial data editors 21, 27 installed on the client computer, such as the Notepad and Wordpad (Microsoft) for editing large text (ASCII) or character data files, the AudioStation 32 (Voyette Turtle Beach, Inc.) for editing audio data, the Paint Shop (Microsoft) and Photoshop (Adobe Systems, Inc.) for editing images and pictures, the Animation Shop (Jacs Software, Inc.) for editing animations, and the  
10 VideoStudio (Ulead Systems, Inc.) for editing video data files. Actually, there are many other commercial data editing software products available on the market and can be selected as the data editors for the database data editing system of the present invention.

The client computer Window GUIs 28 are implemented by using Java AWT, Swing, or alternately by Visual C++, Visual Basic, etc. The client GUI forms access and communicate with the server database through the JDBC/ODBC (Java DataBase Connection/Open DataBase Connection) bridge and SQL (Structured Query Language) through the intranet 29. The data transmission between the client computer and the server computer is achieved by creating a JDBC/ODBC connection. The JDBC driver is  
15 created by bridging the JDBC to ODBC as a JDBC/ODBC bridge, or by directly connecting the JDBC to the database. The JDBC and the DataBase Management System (DBMS) also contain some built-in methods, functions and procedures to process the large text or binary data files.  
20

Figure 3 further demonstrates the detail components and mechanisms of the major client Windows GUI forms of the database data editing system of the present invention. The Database Data Manger form 41 contains a Header Panel 42 and a Detail Panel 43 as well as the Menu lists and Icon buttons on the top of the form. The Header Panel lists the databases and the database tables for each database. The Detail Panel lists several major tools and utilities including the DB Designer, Entity Relationship (ER) Designer, Table  
25 Designer, Database Schema, Data Filter, SQL Console, etc. When a database name listed on the Header Panel is double-clicked by the mouse, the Detail Panel is displayed for the  
30

database. The DB Designer is used to create and modify a database and the tables. The ER Designer is used to design, display and edit the database entity relationship. The Table Designer is used to design and edit the table data structure. The DB Schema edits and displays the database data structure and micros. The Data Filter is used to select a subset of the data from a table or tables of the remote database. The SQL Console is used to write and execute SQL query directly to the remote database. When a database table listed on the Header Panel is double-clicked, the table is displayed as a Single Document Interface (SDI) table 44. When the multiple tables are double-clicked on the Header Panel, the database tables are displayed as the Multiple Document Interface (MDI) tables 45 simultaneously. The table contents are retrieved from the remote database and displayed on the client screen as either a SDI table or MDI tables. The MDI tables display the data of multiple tables concurrently, which are useful to compare the data among the different tables. An MDI table is activated by clicking the table form and the table form is displayed on the front screen. The data of a table cell is edited as the mechanisms stated above by either directly editing on the cell or on the popped-up commercial data editor 46, 47, 48, 49.

(Figure 3 further demonstrates the detail components and mechanisms of the major client Windows GUI forms of the database data editing system of the present invention. The Database Data Manger form 41 contains a Header Panel 42 and a Detail Panel 43 as well as the Menu lists and Icon buttons on the top of the form. The Header Panel lists the database tables. The Detail Panel consists of several folders including an Entity Relationship (ER) Designer, a Table Designer, a Database Schema, a Data Filter, an SQL Console, etc. The ER Designer is used to display and edit the database entity relationship. The Table Designer is used to edit the table data structure. The database Schema displays the database data structure and micros. The Data Filter is used to select a subset of the data from a table or tables from the remote database. The SQL Console is used to run SQL query directly to the remote database. The database tables are displayed as either a Single Document Interface (SDI) table 44 or the Multiple Document Interface (MDI) tables 45. When the mouse single-clicks a table name listed on the Header Panel, the table contents are retrieved from the remote database and displayed on the client screen as a SDI table 44. The user can also select and single-click the multiple table

names, then the MDI tables 45 are displayed. The MDI tables display the data of multiple tables, which are useful to compare the data among the different tables. The user can active a certain table by clicking the table form and the table form is displayed on the front screen. The data of a table cell is edited as the mechanisms stated above by either directly editing on the cell or on the popped up data editor 46, 47, 48, 49.)

The web version of the database data editing system of this invention is demonstrated by Figure 4. The web editing system consists of a computer server 73 containing a database 72 and a web server 71 and a computer client 68 containing a web browser 69. The client computer browser communicates with the web server by HTTP through Internet 70. When the client browser sends a request to the web server, the web server communicates with the database and replies to the client browser, where the database data is passed by the web server between the browser and the database. The system is implemented mainly by using Java and web technologies. The IITML (HyperText Markup Language), DHTML (Dynamic HTML), JavaScript and Java Applets are used to implement the web pages. The Java Servlets and Java ServerPages are used to implement the middle-ware, and the JDBC/ODBC and SQL are used to retrieve and transfer data between the web server and the database.

The Database Data Manager web page, which is similar to the Database Data Manager form Figure 3 (41) of the client/server version, is comprised of a Header Frame and a Detail Frame. The Header Frame contains a list of the databases and database tables for each database. The Detail Frame contains several tools and utilities such as the DB Designer, ER Designer, Table Designer, DB Schema, Data Filter, SQL console, etc. The functions of these tools and facilities are similar to those of the client/server version Figure 3 (43). When a database name listed on the Header Frame is double-clicked, the Detail frame for the database is retrieved and displayed from the remote web server. When a tool listed on the Detail Frame is double-clicked, a new web page of the tool is retrieved and displayed by the browser. When a table name listed on the Header Frame is double-clicked, a new web page 62 that contains the table data from the remote database is displayed. The user can double-click multiple table names on the Head Frame and the multiple table web pages are displayed. The data on the table cells 63 are defaulted as read-only. When the user single-clicks a cell, the data of the cell 64 is directly edited.

The large text data type and binary data type is first displayed as a small icon 65, 66 in the table cell as the place holder without actual data. When the icon is double-clicked, a commercial data editor is called and popped up from the local client computer 61, 67. The data file is then automatically downloaded into the data editor from the remote  
5 database through the Internet 70. The database data is edited by using the facilities provided by the commercial data editor. The edited data is saved and sent directly back to the original database 72 through the Internet.

The web version of the integrated database data editing system in the invention has more advantages compared to the client/server version. It is easier to implement the  
10 data security features by using the Public Key Infrastructure (PKI) and Secure Socket Layer (SSL). The firewall is also used to protect the server computer that contains the web server and database. Further more, the web version of the integrated database data editing system can be deployed to any other networks besides Internet.

The user authentication and access control mechanisms are implemented for both  
15 the client/server version and the web version. A system administrator is granted the privilege to access all the objects of the integrated database data editing system and also has the privilege to assign a user to the user group with different levels of access ability. A user is only permitted to access a subset of the objects of the database data editing system by the system administrator. The user authentication and access control  
20 mechanisms in the present invention is designed to work seamlessly with those of the corresponding relational database.

(The web version of the database data editing system of this invention is demonstrated by Figure 4. The web editing system consists of a computer server 73 containing a database 72 and a web server 71 and a client 68 containing a web browser  
25 69. The system is implemented mainly by using Java and web technologies. The Servlets and Java ServerPages are used to implement the middle ware, JDBC/ODBC are used to retrieve and transfer data from or to the database, and the HTML, DHTML, JavaScript and Applets are used to implement the web pages. The client computer uses web browser to communicate with the web server through Internet by HTTP 70. The  
30 Database Data Manager web page is similar to the Database Data Manager form 41 (Figure 3) of the client/server version, and is comprised of a Header Frame and a Detail

Frame. The Header Frame contains a list of the database tables. The Detail Frames contains several separate folders, which include the Entity Relationship Designer, the Table Designer, the Database Schema, The Data Filter, the SQL console, etc., and the functions of these tools are similar to those of the client/server version (43, Figure 3).

- 5 When the user clicks a table name listed on the Header Frame, a new web page 62 that contains the table data from the remote database is displayed. The data on the table cell 63 is also defaulted as read-only. When the user single-clicks a cell, the data of the cell 64 is directly edited, and when the user double-clicks a cell 65, 66, a commercial data editor is called and popped up from the local client computer 61, 67. The data file is  
10 automatically loaded into the data editor. The user edits the database data by using the facilities provided by the data editor. The edited data is saved to the table web page 62 and then sent directly back to the original database through the Internet.)

- In brief summary, the integrated database data editing system of this invention directly retrieves, edits, and saves the database data to the remote database through either  
15 intranet or Internet. This system provides an efficient, easy-to-use visual environment, graphic user interfaces and tools to manage and edit the database data contents, which is especially useful for the large text data type or large binary data type that is usually very difficult to handle. The user authentication and access control mechanisms of the database data editing system are well implemented. The Secure Socket Layer (SSL),  
20 Secure Electric Transaction (SET) and Public Key Infrastructure (PKI) technologies are used for secure data transmission through the Internet.

- (In brief summary, the integrated database data editing system of this invention directly retrieves, edits, and saves the data to the remote database through either intranet or Internet. This system provides us an efficient, easy-to-use visual environment and  
25 tools to edit the database data, especially the large text or binary data which are usually very difficult to handle, and will greatly benefit the most business software applications and the general users. The Java technology is mainly used to implement the database data editing system of the present invention. Alternately, other computer languages, such as C++, C, Visual C++, Visual Basic, etc., can also be used to implement both the  
30 client/server version and the web version of the editing system. The user authentication and access control mechanisms of the database data editing system are well implemented.

The Secure Socket Layer (SSL), Secure Electric Transaction (SET) and Public Key Infrastructure (PKI) technologies are used for secure data transmission through the Internet.)

## CLAIMS

What I claim as my invention is:

- 5      I.(amended) An integrated relational database data editing system providing the visual environment, graphic user interfaces and tools in the client computer to remotely access a server computer that contains a relational database and to manage and edit the database data contents through either the intranet or the Internet, and said system includes the following mechanisms and characters:
- 10      (i) said client computer retrieves the database data from the remote server computer database, modify, update, input, output the data and then sends the data back to the original database; and
- 15      (ii) said client computer directly edit and modify the database data without writing detail computer language codes in an efficient and easy-to-use manner; and
- 15      (iii) said client computer directly edit and modify the large text data type and large binary data type by using a plurality of commercial text and multimedia data editors installed on the client computer; and
- 20      (iv) said database data editing system implements the user authentication and access control mechanisms.
- 20      (1. An integrated database data editing system, including the following mechanisms and characters:
- 20      (i) the system edits database remotely through either intranet or Internet or locally on the same computer; and
- 25      (ii) the editing system provides visual graphic user interfaces and tools which are very efficient and easy-to-use; and
- 25      (iii) the system is used to edit the text (ASCII), character and binary data; and
- 25      (iv) the system is specially valuable for editing the large text or binary database data files; and
- 30      (v) the system incorporates the commercial text or multimedia data editors to edit the database data; and
- 30      (vi) the user authentication and access control mechanisms are well implemented; and

(vii) the database data transmission through Internet is secured by using the Secure Socket Layer (SSL), Secure Electronic Transaction (SET) and Public Key Infrastructure (PKI) technologies.)

5        2.(amended) The database data editing system of claim 1 contains the well-defined graphic user interfaces and tools that displays a database table or a subset data of a table and has the following novel characters:

- (i) said database data on each table cell is defaulted as read only; and
- (ii) said database small text data on each table cell is directly edited when  
10 single-clicked by the mouse; and
- (iii) said table cell contains a small icon as a place holder for the large text data type or large binary data type; and
- (iv) said commercial data editor is popped up from the local client computer when double-clicked the small icon of a table cell by the mouse and the database data is  
15 downloaded into the data editor from the remote database and is sent back to the original database when data editing is completed; and
- (v) said data editor is either a text editor or a multimedia editor depending on the data type inside the table cell.

20        (2. The database data editing system of claim 1 contains a well-defined graphic user interface that displays a database table or a subset data of a table and has the following novel characters:

- (i) the data on each table cell is defaulted as read only; and
- (ii) the data on each table cell is editable when "single-clicked" by the mouse;  
and
- 25        (iii) a commercial data editor is called and "popped up" from the local client computer when the user "double-clicks" the data of a table cell by the mouse; and
- (iv) the data editor is either a text editor or a multimedia editor depending on the data type inside the table cell; and
- (v) a list of available data editors is available for the user to choose.)

30



3.(amended) The database data editing system of claim 1 contains a Database Data Manager in said client computer comprising a Header Panel and a Detail Panel, which provides a user-friendly visual environment and tools to manage and edit the database data contents.

5 (3. The database data editing system of claim 1 contains a Database Data Manager which provides a user-friendly environment and tools to edit the database data; and which contains a Header Panel or Frame containing a Database Table List and a Detail Panel or Frame including a Entity Relationship Designer, a Table Designer, a Database Schema, a Data Filter and an SQL Console.)

10 4.(amended) The Header Panel of the Database Data Manager of Claim 3 contains a list of databases and database tables for each database, and

- (i) a Detail Panel is popped up when double-clicked the database name; and
- (ii) a database table is popped up when double-clicked the table name.

15 (4. The client/server version of the editing system of claim 1 is installed and run on the intranet and is implemented by using mainly Java technologies such as Java AWT, Swing, Applet, JDBC/ODBC, SQL, etc.)

5. The Detail Panel of Claims 3 & 4 further contains:

- 20 (i) a DB Designer for creating and modifying the database; and  
(ii) an ER Designer for editing and displaying the entity relationships of the database tables; and

(iii) a Table Designer for designing the database tables; and  
(iv) a DB Schema for designing and displaying the database data structure and  
25 micros; and

(v) a Data Filter for selecting a set of data from one or more database tables;  
and

(vi) a SQL Console for writing and executing the SQL codes.

(5. The wherein said Database Data Manager of claim 3 of wherein said  
30 client/server version of claim 4 can call either the Single Document Interface (SDI) form

(6) The web version of the coding system of claim 1 is installed on a web server and accessed through the Internet by a client and is implemented by using multi-Java and web technologies such as Servlet, Java ServerPages, JSP, JAVAX<sup>®</sup>, CGI, HTML, PHPBBT, PowerScript, Applet, etc.)

<sup>2</sup>(new) The early version of the database data editing system of claim 1 is developed and run on the Internet and also the network and further has more advantages in accordance with the security features by using the Public Key Infrastructure (PKI) and Secure Sockets Layer (SSL).

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[illegible]

20 (14) Integrated Database data entry system for editing text, character and binary  
students data remotely through networks in an efficient and easy-to-use manner. The  
caching system containing a visual database data structure, which contains a list of database  
tables, an entity relationship diagram, a table designer, a database window, a data view  
and an SQL console. A special graphic user interface is well defined. From which the  
25 commercial and non-commercial data editors are called and "popped up" from the local  
client computer by double-clicking the table cell, and the table data cell is directly  
edited by single-clicking the table data cell. Two versions of the database data editing  
system are implemented. The client/server version is installed and runs on the internet,  
which supports both the single database instance (SDI) forms or the multiple database  
30 interface (MDI) forms to display the database tables. The web version is installed on a

interface (MIM) forms to display the database tables. The web version is installed on

web server and run through the Internet. The mechanisms for user authentication and access control and the data transmission through Internet are well implemented.)

Figure 1

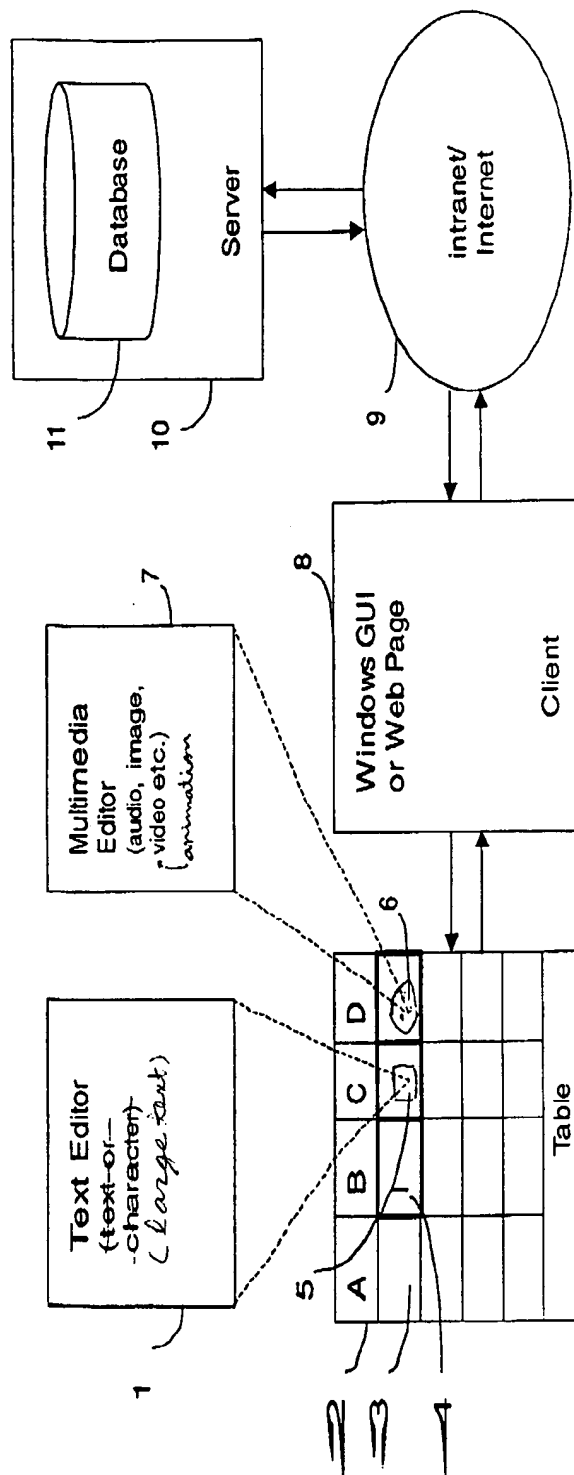


Figure 3

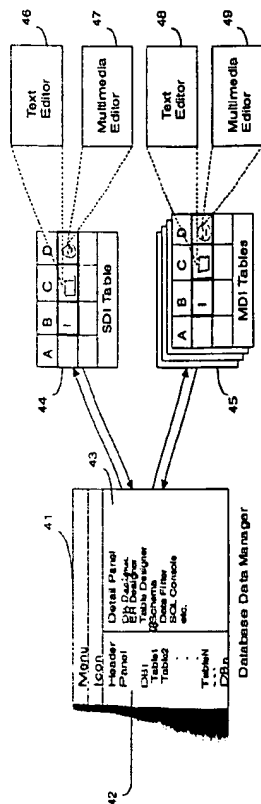


Figure 2

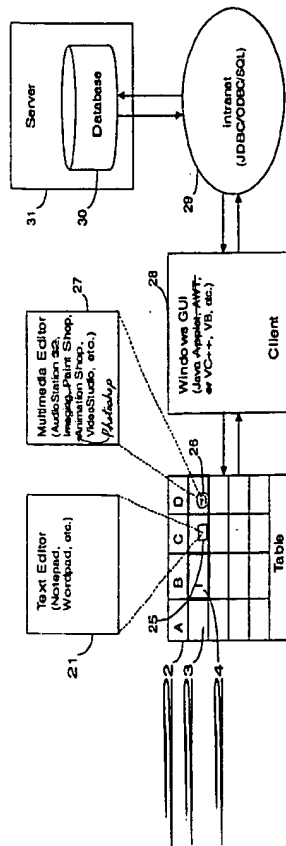
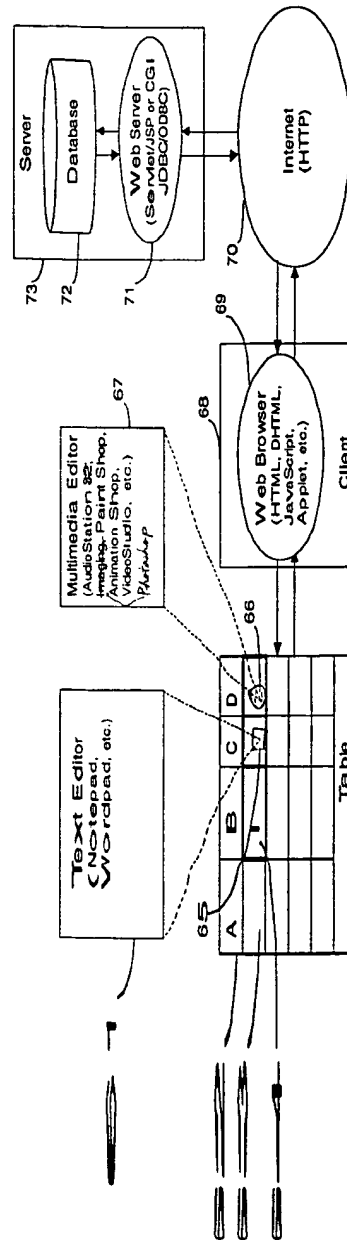


Figure 4



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